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amount set by the committee is \$1,000,000, a large part of which is to be devoted to endowment of the institution after it is built. The memorial to Dr. Jacobi, which will be for children only, will probably be erected as an annex to the Jewish Memorial Hospital, but will be non-sectarian in character. The committee desires to endow as many free beds in the hospital as possible as a tribute to Dr. Jacobi's labors among the poor of the city.

CAPTAIN HERBERT C. GRAVES, hydrographer in charge of coastal surveys of the Coast and Geodetic Survey, died suddenly in London on July 26, at the age of forty-nine. He had been abroad since June 12 as a representative of the United States at the International Hydrographic Conference, and was also one of the delegates from the American Section of the proposed International Geophysical Union, which met in Brussels in July.

SIR BOVERTON REDWOOD, distinguished for his contributions to the study of petroleum, died in London on June 4, at the age of seventy-three years.

THE death is announced of Mr. A. W. Ward, since 1889 professor of physics at Canning College, Lucknow, India.

DR. JOSÉ G. HERÁNDEZ, one of the most prominent physicians of Venezuela, and known for his scientific work, was killed at Caracas on June 30, in an automobile accident. A period of public mourning has been declared.

It is stated in *Nature* that the meeting of the International Research Council, which was opened at Brussels on July 18 in the presence of the King of the Belgians, concluded its labors on July 28. Much successful work was accomplished. The statutes of the International Council were finally agreed to, and unions embracing the whole subject of astronomy and the various sections of geophysics were formed. In other branches of pure and applied science proposals for the formation of international associations were discussed and formulated. These will have to be submitted to the authorities concerned in the different countries before they can be formally adopted. A resolution inviting the cooperation of nations that had remained

neutral during the war was adopted unanimously. Brussels was selected as the legal domicile of the International Research Council. Its triennial meetings will be held in that city, and gifts or legacies will be administered according to Belgian law. But the associations dealing with special subjects will probably follow the established custom of holding their conferences successively in different countries. The secretariat of the council will be at Burlington House, where the Royal Society has placed a room at the disposal of the general secretary.

M. BASILE ZAHAROFF has made a gift of 500,000 francs to the Paris Museum of Natural History to be used in its restoration, enlargement and improvement.

CHEMISTS and assistants on the staff of the Health Department of New York City have joined the Union of Technical Men affiliated with the American Federation of Labor.

THE University of California has received the Malcolm P. Anderson collection of scientific specimens of mammals and birds the gift of Mrs. Elizabeth G. Anderson, of Alameda. Mr. Anderson, recently deceased, was a naturalist who carried on field work in Asia for many years in the interests of the British Museum.

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#### UNIVERSITY AND EDUCATIONAL NEWS

It is announced that Yale University will receive approximately \$18,000,000, about \$3,000,000 in excess of the expectation of the university corporation, from the estate of John W. Sterling.

EDWARD F. SEARLES, of San Francisco, has given stock valued at \$1,500,000 to the University of California for its unrestricted use.

DR. T. M. PUTNAM, professor of mathematics and dean of the undergraduate division in the University of California, has been appointed acting dean of the college of letters and science in the place of the late Professor H. Morse Stephens.

E. B. BROSSARD, Ph.D., has been appointed head of the department of farm management,

which was recently established at the Utah Agricultural College and Experiment Station.

M. E. GRABER, professor of mathematics at Heidelberg University, has been appointed professor of physics at Morningside College, Sioux City, Iowa.

DR. S. I. KORNHAUSER, formerly associate professor of zoology at Northwestern University and recently relieved from duty in the Sanitary Corps of the Army, has been appointed acting professor of zoology at Denison University in the absence of Professor Fish.

M. PAUL APPELL, dean of the faculty of sciences, Paris, has resigned from the office that he has held for sixteen years and has been succeeded by M. Houssay, professor of zoology.

AT the University of Bristol, Dr. Otto Vernon Darbishire, lecturer in botany, has been promoted to a professorship; Dr. H. Ronald Hassé has been appointed professor of mathematics; Dr. Arthur Mannering Tyndall, professor of physics; George A. Buckmaster, professor of physiology, and Major Andrew Robertson, professor of mechanical engineering.

## DISCUSSION AND CORRESPONDENCE

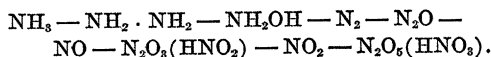
### THE VALENCE OF NITROGEN IN NITROUS OXIDE

PROFESSOR W. A. NOYES in his address before the American Association for the Advancement of Science in December, 1918,<sup>1</sup> spoke very convincingly in favor of the theory of positive and negative valences. The work of Falk, Nelson and Fry in attempting to apply the conception of electrons to the theory of valence was commended and the theory of G. N. Lewis with regard to non-polar valencies in organic substances was justly criticized. While pointing out that some of our ideas need revision, Professor Noyes advocated a new formula for the well-known compound, nitrous oxide. According to Noyes, the formula should be  $O=N\equiv N$ .

Nitrous oxide,  $N_2O$ , is usually given the following structural formula:

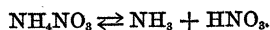


According to this formula each nitrogen atom is given a valence of three, but two of the bonds from each nitrogen atom are arranged so that they neutralize one another. The oxygen atom is by common consent given a negative valence of two, so that the polarity (*i. e.*, sum of the positive and negative valences) of each nitrogen atom may be regarded as  $+1$ . According to the conception of positive and negative valences, and in line with Abegg's assumption that the non-metallic elements exhibit maximum positive and negative valences the sum of which is eight, the nitrogen series embraces at least nine stages which, starting with ammonia, in which nitrogen has a negative valence of three, and ending with nitric acid, in which nitrogen has a positive valence of five, runs as follows:



The commonly accepted formula for nitrous oxide, which is to be discarded according to Noyes, fits very nicely in this series. In Dr. Noyes's formula, to be sure, he would assume that one nitrogen has a positive valence of five and the other a negative valence of three and, since the algebraic sum of all of the valences on both atoms of nitrogen is  $+2$ , the average polarity of the nitrogen is  $+1$  as in the old formula. It is obvious that this explanation is a little more complicated than that suggested by the old formula.

Professor Noyes justifies his new formula for nitrous oxide by an ingenious explanation of the way in which this substance is formed from ammonium nitrate. In ammonium nitrate, Noyes is willing to admit that one nitrogen has a negative polarity of three and the other a positive valence of five. When ammonium nitrate is heated, Noyes assumes that the salt is decomposed at first into ammonia and nitric acid,



The ammonia and nitrate acid then tend to form an isomer of ammonium nitrate,

<sup>1</sup> SCIENCE, 44, 175-182, 1919.